TITLE OF THE INVENTION

A MONITOR APPARATUS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Korean Patent Application No. 2003-22444, filed April 9, 2003, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates to a monitor apparatus, more particularly, to a monitor apparatus having an improved structure to rotate a monitor relative to a base.

2. Description of the Related Art

[0003] As shown in FIG. 1, a conventional monitor apparatus comprises a base 101 seated on a predetermined plane, a monitor 102 to display a picture thereon, a connecting member 110 to connect the base 101 to the monitor apparatus 102, and a spring member 160 to elastically bias the connecting member 110 upward with respect to the base 101.

[0004] The connecting member 110 has a lower part rotatably connected to a pair of base brackets 104 and 106 that are combined to the base 101, and an upper part incorporated with the monitor 102.

[0005] The spring member 160 has resilience elastically biasing the connecting member 110 upward with respect to the base 101that corresponds to the weight of the monitor 102.

[0006] Thus, the connecting member 110 can be tilted up and down with respect to the base 101 as shown with an arrow "A" in FIG. 1, however, the monitor 102 cannot be tilted with respect to the connecting member 110.

[0007] As shown in FIGS. 2A and 2B, according to the conventional monitor apparatus, it is impossible to change a tilting angle between the monitor 102 and the connecting member 110. Therefore, when the connecting member 110 is tilted towards the base 101, the distance

between the monitor 102 and the base 101 is adjusted as shown in FIG. 2B, making it inconvenient for a user to view a screen of the monitor apparatus.

[0008] In contrast, a monitor apparatus (not shown) has been provided according to which the connecting member has the upper part rotatably connected to the monitor, and has the lower part incorporated with the base. Accordingly, even though the angle between the monitor and the connecting member can be varied, it is impossible to adjust the height of the monitor with respect to the base 101.

[0009] Recently, various sizes of monitors have been provided to satisfy consumer demands. However, the conventional monitor apparatus has inflexible structure that does not allow the monitor apparatus to be used with different monitor sizes, thus, it is impossible for the conventional monitor apparatus to effectively accommodate various monitor sizes.

SUMMARY OF THE INVENTION

[0010] Accordingly, it is an aspect of the present invention to provide a monitor apparatus of a monitor adjustable in height and tilting angle as desired, so that the monitor can be adjusted in the tilting angle suitable for a user to easily view a screen of the monitor when the height of the monitor is varied.

[0011] It is another aspect of the present invention to provide a monitor apparatus, which can accommodate various monitor sizes.

[0012] The foregoing and/or other aspects of the present invention are achieved by providing a monitor apparatus comprising: a monitor, and a base to support the monitor. The monitor apparatus further comprises: a first link provided between the monitor and the base; a second link provided between the monitor and the base adjacent to the first link; a base bracket, combined to the base, the base bracket having first and second lower supporting parts to rotatably support lower parts of the first and second links, respectively; a connecting bracket rotatably combined to the monitor, and having first and second upper supporters to rotatably support upper parts of the first and second links, respectively. Further, a first spring is interposed between the first link and the first lower supporting part to elastically bias the first link upward with respect to the base; a second spring is interposed between the second link and the second lower supporting part to elastically bias the second link upward with respect to the base,

where the distance between rotating axes of the first and second lower supporting parts on which the first and second links are rotatably supported, respectively, is greater than the distance between tilting axes of the first and second upper supporters.

[0013] Additional aspects and advantages of the invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

[0014] According to an aspect of the invention, the connecting bracket includes a monitor coupler provided spaced from the first and second upper supporters, and rotatably combined to the monitor.

[0015] According to another aspect of the invention, the monitor apparatus further comprises a link rotation restrictive part to restrict a rotation angle of at least one of the first and second links relative to the base.

[0016] According to another aspect of the invention, the link rotation restrictive part comprises a protrusion protruding from the base bracket to restrict the rotation angle of at least one of the first and second links members by making contact with an upper surface of at least one of the first and second links members.

[0017] According to an aspect of the invention, the first spring includes a torsion spring, which has a first end coupled to a first lower supporting part, and a second end coupled to the first link.

[0018] According to an aspect of the invention, the second spring includes a torsion spring, which has a first end removably coupled to a second lower supporting part, and a second end removably coupled to a second link.

[0019] According to yet another aspect of the invention, the monitor apparatus further comprises a monitor bracket combined to the monitor, and rotatably combined to the connecting bracket.

[0020] According to an aspect of the invention, the monitor apparatus further comprises a monitor tilting restrictive part to restrict a tilting angle of the monitor bracket relative to the connecting bracket.

[0021] According to an aspect of the invention, the monitor tilting restrictive part comprises a projection protruding from the monitor coupler towards the connecting supporter of the monitor bracket, and a stopping part formed by cutting an arc of the connecting supporter provided in the monitor bracket.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] These and/or other aspects and advantages of the invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompany drawings of which:

FIG. 1 is a rear perspective view of a conventional monitor apparatus;

FIGS. 2A and 2B are side views of the conventional monitor apparatus;

FIG. 3 is a rear perspective view of a monitor apparatus according to an aspect of the present invention;

FIG. 4 is an exploded perspective view of the monitor apparatus of FIG. 3 according to an aspect of the present invention;

FIGS. 5A and 5B illustrate tilted positions of a monitor of the monitor apparatus with respect to a connecting bracket according to an aspect of the present invention;

FIGS. 6A and 6B are side views of a monitor tilting restriction technique of the monitor apparatus of FIGS. 5A and 5B according to an aspect of the present invention;

FIGS. 7A and 7B illustrate tilting of a link member with respect to a base of the monitor apparatus according to an aspect the present invention; and

FIG. 8 is a rear perspective view of the monitor apparatus with a relatively light monitor.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] Reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout.

[0024] As shown in FIGS. 3 and 4, a monitor apparatus 1 according to an aspect of the present invention comprises: a base 50 seated on a predetermined plane, a monitor 10 having a screen on which a picture is displayed, a first link 30 provided between the base 50 and the monitor 10, a second link 40 provided adjacent to the first link 30 between the base 50 and the

monitor 10, a base bracket 51 combined to the base 50 to rotatably support lower parts of the first and second links 30 and 40, and a connecting bracket 20 rotatably combined to the monitor 10 to rotatably support upper parts of the first and second links 30 and 40. The monitor apparatus further comprises: a first spring 60 interposed between the first link 30 and the base bracket 51 to elastically bias the first link 30 upward with respect to the base 50, and a second spring 65 interposed between the second link 40 and the base bracket 51 to elastically bias the second link 40 upward with respect to the base 50. Further, the monitor apparatus 1 according to an aspect of the present invention comprises a monitor bracket 13 having a first end combined to the monitor 10, and a second end rotatably combined to the connecting bracket 20.

[0025] The monitor 10 has a screen on which a picture is displayed, where the screen is made of an LCD (Liquid Crystal Display). However, the screen of the monitor may be made of various displays such as a PDP (Plasma Display Panel), etc.

[0026] The monitor bracket 13 is detachably combined to a back of the monitor 10 by screws or other similar elements and/or techniques, and includes a connecting supporter 15 protruding towards the connecting bracket 20.

[0027] The connecting supporter 15 forms a pair corresponding to monitor couplers 21 of the connecting bracket 20 (to be described later). Each connecting supporter 15 is formed with a through hole 16 to be rotatably combined to the monitor coupler 21 of the connecting bracket 20, and the through hole 16 has a noncircular shape so as to be rotated incorporatively with a shaft 18 (to be described later).

[0028] The connecting bracket 20 includes the monitor coupler 21 to rotatably combine with the monitor bracket 13, and first and second upper supporters 23 and 25 to rotatably combine with upper parts of the first and second links 30 and 40, respectively. The connecting bracket 20 forms a pair corresponding to the pair of connecting supporters 15 provided to the monitor bracket 13, and is moved/rotated by only the first and second links 30 and 40.

[0029] The monitor coupler 21 has a protruding part protruding from the connecting bracket 20, where the protruding part is formed with a shaft holder 22 in which the shaft 18 is accommodated, thereby, rotatably combining the monitor coupler 21 with the connecting supporter 15 of the monitor bracket 13. According to an aspect of the invention, the monitor coupler 21 is not aligned with the first or second upper supporters 23 or 25.

[0030] The shaft 18 has a noncircular cross-section to be inserted into the through hole 16 of the connecting supporter 15, so that the shaft 18 and the through hole 16 are incorporatively rotated. According to an aspect of the invention, the shaft 18 is fitted into the shaft holder 22 along with a flat spring 19.

[0031] Further, there is provided a monitor tilting restrictive part to restrict a tilting angle of the monitor bracket 13 relative to the connecting bracket 20.

[0032] The monitor tilting restrictive part comprises a projection 27 protruding from the monitor coupler 21 towards the connecting supporter 15 of the monitor bracket 13, and a stopping part 17 formed by cutting an arc off the connecting supporter 15 provided to the monitor bracket 13. Here, the angle of the arc of the stopping part 17 can vary in consideration of the tilting angle of the monitor 10 combined to the monitor bracket 13.

[0033] Thus, a user can tilt the monitor 10 at a predetermined angle with respect to the connecting bracket 20 with force to overcome rotation resistance of the shaft 18.

[0034] The first and second upper supporters 23 are provided apart from each other by a predetermined distance, and are rotatably combined to first and second upper couplers 33 and 43 of the first and second links 30 and 40 by a screw or similar techniques and/or elements, respectively.

[0035] The base 50 has a predetermined area large enough to support the monitor 10, and is combined to the pair of base brackets 51 provided apart from each other at a predetermined distance by a screw or similar techniques and/or elements.

[0036] The base bracket 51 forms a pair, and each base bracket 51 has a bottom part combined onto the base 50. Each base bracket 51 includes a first lower supporting part 53 rotatably combined to a lower part of the first link 30, and a second lower supporting part 55 rotatably combined to a lower part of the second link 40.

[0037] The first and second lower supporting parts 53 and 55 are provided apart from each other, and each have a protruding part protruding from the base bracket 51. To the protruding parts are rotatably combined lower parts of the first and second links 30 and 40 by a screw or similar elements and/or techniques.

[0038] The first link 30 has an "H"-shape, and includes a pair of first lower couplers 35, and a pair of first upper couplers 33.

[0039] The first lower couplers 35 are rotatably combined to the first lower supporting parts 53 of the base bracket 51 by a screw or similar elements and/or techniques, respectively. The first upper couplers 33 are rotatably combined to the first upper supporters 23 of the connecting bracket 20 by a screw or similar elements and/or techniques.

[0040] The second link 40 is shaped similar to a bar, and forms a pair. The second link 40 has a second lower coupler 45, and a second upper coupler 43. The second link 40 is provided adjacent to the first link 30, and the second link 40 is placed above the first link with respect to the base 50.

[0041] The second lower combing parts 45 are rotatably combined to the second lower supporting parts 55 by a screw or similar elements and/or techniques, respectively. The second upper couplers 43 are rotatably combined to the second upper supporters 25 of the connecting brackets 20 by a screw or similar elements and/or techniques, respectively.

[0042] However, a single second link may be provided adjacent to the first link 30 in parallel, so that the single second link can be rotatably combined to one second upper supporter 25 and one second lower supporting part 55. Further, the pair of second links may be provided incorporated to each other similar to the first link 30, so that the incorporated second link can be rotatably combined to the pair of upper supporting parts 25 and the pair of second lower supporting parts 55.

[0043] The first spring 60 is interposed between the first link 30 and the first lower supporting part 53, and has resilience elastically biasing the first link 30 upward with respect to the base 50, where the first spring 60 forms a pair. Further, the first spring 60 includes a torsion spring, which is put on the first lower supporting part 53 and has a first end 61 coupled to a first spring supporting part (not shown) provided to the base bracket 51 and a second end 62 coupled to a first spring coupler 37 provided to the first link 30. However, a single first spring may be interposed between the first link 30 and either one of the first lower supporting parts 53.

[0044] The second spring 65 is interposed between the second link 40 and the second lower supporting part 55, and has resilience elastically biasing the second link 40 upward with respect

to the base 50, where the second spring 65 forms a pair. Further, the second spring 65 includes a torsion spring, which is put on the second lower supporting part 55 and has a first end 66 coupled to a second spring supporting part (not shown) provided to the base bracket 51 and a second end 67 coupled to a second spring coupler 47 provided to the second link 40. However, the second spring may be singly interposed between the second link 40 and either of the second lower supporting parts 55.

[0045] According to an aspect of the present invention, the sum of resilience due to the first and second springs 60 and 65 is approximately equal to the weight of the monitor 10. Therefore, when the first and second links 30 and 40 are rotated relative to the base 50, the resilience of the first and second spring 60 and 65 offsets the weight of the monitor 10 to allow a user to easily rotate the first and second links 30 and 40.

[0046] Further, there is provided a link rotation restrictive part to restrict a rotation angle of at least one of the first and second links 30 and 40 relative to the base 50.

[0047] The link rotation restrictive part comprises a protrusion 58 protruding from the base bracket 51, and restricting the rotation angle of the first link 30 by contacting the upper surface of the first link 30. Further, the projection may restrict the rotation angle of the second link 40 by contacting the upper surface of the second link 40. Hence, the protrusion 58 restricts the upward rotation angle of the first and second links 30 and 40. Further, it should be appreciated that the rotation angle can be adjusted by changing the allowable position of the protrusion 58.

[0048] Thus, the height of the monitor 10 is adjusted by rotating the first and second links 30 and 40 relative to the base 50.

[0049] Here, the distance between rotating axes of the first and second lower supporting parts 53 and 55, on which the first and second links 30 and 40 are rotatably supported, respectively, should be greater than the distance between tilting axes of the first and second upper supporters 23 and 25. Accordingly when the distance between the rotating axes of the first and second lower supporting parts 53 and 55 are greater than the distance between the tilting axes of the first and second upper supporters 23 and 25, the first and second upper supporters 23 and 25 rotate backward and forward when the first and second links 30 and 40 are rotated upward and downward relative to the base 50. For example, when the first and second links 30 and 40 are rotated downward relative to the base 50, the height of the monitor

10 is lowered, rotating the upper part of the monitor 10 combined to the connecting bracket 20 backward. Hence, the tilting angle of the monitor 10 is automatically adjusted to allow a user to view the screen. According to an aspect of the invention, the distance between the rotating axes and the distance between the tiling axes are approximately in the ratio of 6:5.

[0050] Accordingly, the monitor apparatus 1 according to an aspect of the present invention operates as follows.

[0051] As shown in FIGS. 5A and 5B, when a user pushes the monitor 10 away from the user (FIG. 5A) or pulls the monitor 10 towards the user (FIG. 5B) with force to overcome the rotation resistance of the shaft 18 in order to tilt the monitor 10 relative to the connecting bracket 20 or the base 50, the monitor 10 rotates about the shaft 18 relative to the connecting bracket 20 to allow the user to adjust the tilting angle of the monitor 10. Here, the connecting bracket 20 rotates only when the first and second links 30 and 40 are rotated, and the connecting bracket 20 does not rotate relative to the base 50. Further, an allowable tilting angle of the monitor 10 is restricted to the mobility of the projection 27 within the stopping part 17. Herein, it should be appreciated that the allowable tilting angle of the monitor 10 can be adjusted by changing the shape of the stopping part 17 (refer to FIGS. 6A and 6B).

[0052] As shown in FIGS. 7A and 7B, when the first and second links 30 and 40 are rotated upward and downward relative to the base 50 to adjust the height of the monitor 10, a user can easily rotate the first and second links 30 and 40 because the resilience of the first and second spring 60 and 65 offsets the weight of the monitor 10. Here, because the distance between the rotating axes of the first and second lower supporting parts 53 and 55 are greater than the distance between the tilting axis of the first and second upper supporters 23 and 25, the connecting bracket 20 rotates backward and forward relative to the first and second links 30 and 40 when the first and second links 30 and 40 are rotated upward and downward relative to the base 50. For example, when the first and second links 30 and 40 are rotated downward relative to the base 50, the height of the monitor 10 is lowered, rotating the connecting bracket 20 backward relative to the first and second links 30 and 40. Consequently, the monitor 10 combined to the connecting bracket 20 is rotated backward. At this time, the monitor 10 rotates incorporatively with the connecting bracket 20 because of the rotation resistance due to the shaft 18 combining the monitor 10 with the connecting bracket 20. Hence, the tilting angle of the monitor 10 is automatically adjusted to allow a user to view the screen. Further, an

allowable upward rotation angle of the first and second links 30 and 40 is restricted by the protrusion 58. However, it should be appreciated that the allowable rotation angle can be variously adjusted by changing the position of the protrusion 58.

[0053] As described above, according to the monitor apparatus 1, both the height and the tilting angle of the monitor 10 can be adjusted as desired. Also, the height of the monitor 10 is adjusted while keeping the tilting angle thereof within an angle suitable for a user to view the screen.

[0054] According to an aspect of the present invention, the second spring 65 is removably coupled to the second lower supporting part 55 and the second link 40. Because the sum of resilience due to the first and second springs 60 and 65 is approximately equal to the weight of the monitor 10, according to an aspect of the invention, at least one of the first and second springs 60 and 65 is removably provided in order to correspond to various weights of monitors.

[0055] For example, the first spring 60 has a resilience corresponding to the weight of a 17-inch monitor, and the second spring 65 has the resilience corresponding to a weight difference between a 19-inch monitor and the 17-inch monitor.

[0056] When the monitor apparatus comprises a 19-inch monitor, both the first and second springs 60 and 65 are provided to the monitor apparatus 1 (refer to FIG. 3). But when a 17-inch monitor, which is lighter than the 19-inch monitor, is used, only the first spring 60 is provided to the monitor apparatus 1 without the second spring 65 (refer to FIG. 8). Hence, monitors with different sizes can be selectively mounted on the monitor apparatus 1.

[0057] Thus, the monitor apparatus according to an aspect of the present invention can accommodate various monitor sizes because of the first and second springs 60 and 65 having a resilience corresponding to the various weights of the monitor.

[0058] As described above, an aspect of the present invention provides a monitor apparatus where a monitor can be adjusted in both height and a tilting angle as desired, and the height of the monitor is adjusted while keeping the tilting angle thereof in an angle suitable for a user to view at the screen.

[0059] Further, an aspect of the present invention provides a monitor apparatus accommodating various sizes of a monitor via using a removable spring member.

[0060] Although a few embodiments of the present invention have been shown and described, it will be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined in the appended claims and their equivalents.